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TAXONOMY AND NOMENCLATURE

# Two new Neotropical species of Drosophilinae (Diptera: Drosophilidae) from Uruguay

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ABSTRACT. Two new species of Drosophilidae from Uruguay are described and illustrated: *Drosophila montevidensis* **sp. nov.** (Holotype male in MZSP: Facultad de Agronomía, Universidad de la República, Montevideo city, Department of Montevideo), and *Scaptomyza pipinna* **sp. nov.** (Holotype male in MZSP: Sarandí del Consejo, near north shore of Laguna de Castillos, Department of Rocha). The former species belongs to the *D. tripunctata* group and is sibling to *Drosophila nappae* Vilela, Valente & Basso-da-Silva, 2004, differing mainly in characters of the aedeagus. The latter is closely related to *Scaptomyza striaticeps* Wheeler & Takada, 1966, from which it can be distinguished by color and terminalia characters. The new *Drosophila* species was successfully cultured in a modified banana-agar medium which is provided. Photomicrographs of mitotic and meiotic chromosomes of *D. montevidensis* **sp. nov.** are also included.

KEY WORDS. Argentina, *Drosophila tripunctata* group, karyotypes, *Mesoscaptomyza*, taxonomy.

For decades, *Drosophila nappae* Vilela, Valente & Basso-da-Silva, 2004, a South American species belonging to the *D. tripunctata* group, was misidentified under the nominal species *Drosophila angustibucca* Duda, 1925 described from Central America. *Drosophila angustibucca* is apparently endemic to Costa Rica and adjacent countries, whereas *D. nappae* occurs in the Atlantic forest of southeastern and southern Brazil and most probably also in Paraguay (Vilela et al. 2004).

During a preliminary survey of the drosophilid fauna of Uruguay, conducted during the last two decades, the first author collected some specimens of an unknown *Drosophila* Fallén, 1823 species which had been cited by Goñi et al. (1997, 1998) as *D.* gr. *tripunctata* and as an unidentified species of the *D. tripunctata* group, respectively. At that time, Goñi and colleagues believed that their unknown specimens of *Drosophila* belonged to an undescribed species, which would be later described as *D. nappae* (Vilela et al. 2004) from flies collected at Porto Alegre, state of Rio Grande do Sul, southern Brazil. More recently, we became convinced that the unidentified specimens from Uruguay cited by Goñi et al. (1997, 1998) do not belong either to *D. angustibucca* or to *Drosophila nappae*, but are members of a sibling and still undescribed species referred to as *D.* aff. *nappae* in Goñi et al. (2012). The specimens unidentified to species rank were collected in southern Uruguay by net sweeping over fallen, decaying fleshy seeds of maidenhair tree (*Ginkgo biloba* L.) and decaying fruits of both native and exotic plants or emerging from such fruits (Goñi et al. 1997, 1998), or attracted to dung and carrion baited pitfall traps (Goñi et al. 2012). Only by checking the male terminalia, mainly the shape of their aedeagi, of this pair of sibling species it is possible to tell them apart. Additionally, a single male of an undescribed species of *Scaptomyza* Hardy, 1849, closely related to the Colombian *Scaptomyza striaticeps* Wheeler & Takada, 1966, was collected by net sweeping over grass by our colleague Maria E. Martínez at the eastern wetlands (bañados in Spanish) of the Uruguayan Department of Rocha.

The purpose of the present paper is to erect names to these two species new to science, and to present their formal descriptions, including the karyotype description of the new *Drosophila* species.

## MATERIAL AND METHODS

Specimens examined are deposited in the Entomological Collection (Diptera), Facultad de Ciencias, Universidad de la República, Montevideo, Uruguay (FCE-D) and the Museu de Zoologia, Universidade de São Paulo, São Paulo, Brazil (MZSP).



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Refer to Bächli et al. (2004) for the terminology used in the descriptions, to Vilela (1983) and Vilela & Bächli (1990) for measurements and indices, to Kaneshiro (1969) and Wheeler & Kambysellis (1966) for details on the methods of preparing the terminalia. Type labels include clarifying notes in square brackets; a slash indicates a label change. In the descriptions, average measurements are followed by range in parentheses. All types were dissected and their terminalia photomicrographed. The disarticulated terminalia are kept in a microvial filled with glycerin and attached by the stopper to the pinned specimen. Photomicrographs of imagoes were taken with an Olympus camera (PM2) loaded with an analog 35 mm Fujichrome Professional 64T film and attached to an Olympus stereomicroscope (SZ11) with a ring illuminator. Photomicrographs of the aedeagi+aedeagal apodeme, inner spermathecal capsules, and oviscapt valves were taken using a black & white APX25 Agfa Pan analog film in Zeiss photomicroscope. The originally analog films (slides and negatives) were later converted to a digital format using an Epson scanner (Perfection 4180 Photo). Line drawings of the terminalia were made using a Zeiss microscope, under an objective 40x, attached to a camera lucida (1.8x). Whenever in the same plate, all line drawings were drawn to the same scale and all photomicrographs were taken and enlarged to the same magnification.

Four *Drosophila* isofemale lines (coded Q23F2, Q37F53, Q37F56, and Q49F1, see material examined) were used as non-type material to determine the species karyotypes and analyze the male meiotic chromosomes. The latter strain was also used for the analyses of the general body and eye colors, eggs and puparia. Additionally, adult males and females from the line Q37F55 were double mounted and photomicrographed. For comparison purposes, male and female specimens of *D. nappae* sampled from two isofemale lines (I42F56 and I73F254), derived from wild females collected at the Forest Reserve of IB-USP (São Paulo city, state of São Paulo, Brazil), 26-28.III.1996 and 26-28.VIII.1997 respectively, V. Ratcov and C.R. Vilela leg. (MZSP), plus one male of the same species collected at Morro Santana, Porto Alegre (state of Rio Grande do Sul), III.1995, L. Basso da Silva leg. (MZSP) were dissected and their terminalia photomicrographed. The cited isofemale lines were cultured in a cheap, long-lasting, and suitably modified banana-agar culture medium (detailed below) at constant temperature (18 ± 1 °C) and photoperiod (13h light: 10h dark). Because this modified medium is also used to culture many other species of this genus, including *Drosophila melanogaster* Meigen, 1830, and its mutants, it is worthwhile mentioning here its recipe, as detailed below.

Ingredients. Tap water (1000 ml), agar (10 g), five medium-sized, peeled, and overripe bananas (preferentially *Nanica* cultivar) blended in advance with 125 ml of tap water (to get a banana purée, which may also be stored at -20 °C for up to one year), aqueous solution of brewer yeast (15 g of powder in 125 ml of tap water), 10% Nipagin® solution in ethanol (18 ml), both latter solutions prepared in advance.

Cooking instructions. Prepare a wet mixture of tap water and agar, bring it to a boil in a pot, stirring once in a while to prevent clumping, add banana purée and brewer yeast solution and boil it again, stir the mixture, turn off fire and let it cool to about 60 °C before adding Nipagin. Stir well, pour it into cylindrical glass vials (20 x 100 mm) and plug them. After cooling and drying at room temperature the vials medium may be preserved for up to three weeks in the refrigerator (ca. 8 °C). After transferring the imagines to a new vial, a tiny ball (about the size of a homeopathic pill) of live baker's yeast should be added.

The following tips may be useful to maintain the strains at a temperature of 18 °C, ideal for keeping specimens of most of the species of the *D. tripunctata* group in laboratory. The emerged adults are to be transferred to new vials once a week. Turning and keeping the vials upside down until the adult flies reach sexual maturity (ca. two weeks) and also during the subsequent week, reduces the adult mortality caused mainly by the cataleptic behaviour observed in many of these flies whenever they are disturbed (Frota-Pessoa 1954). The vials from the first two weeks are usually devoid of eggs and larvae and must be discarded. The sexually mature flies (ca. 14-day old) are transferred into the new vial kept upside down to oviposit for one week. Later on, flies can be either discarded or transferred into new vial, if needed. Alternatively, sexually mature flies could be transferred to vials with powdered milk-agar medium for egg laying and larval development (Bächli et al. 2000). No additional yeast needs to be added at this point. One week later, the medium becomes double-layered due to the presence of large amount of growing larvae. At this stage ca. four V-shaped filter paper strips (ca. 1,8 x 10 cm) are inserted into the medium to reduce the excess of humidity.

Mitotic and meiotic chromosomes of the new *Drosophila* species were obtained by applying the technique of Imai et al. (1977, 1988) and Matsuda et al. (1983). Cytology procedure follows Vilela & Goñi (2015). Cytological preparations were made from single individuals by using the isofemale lines coded Q23F2 and Q37F53 (see material examined, and observed in an Olympus BX60® microscope equipped with an Olympus U-MAD-3® camera, under an objective 100x and 1.6x optovar magnification changer. Selected mitotic and meiotic cells were photomicrographed using the Image-Pro Plus® version 5.1 image analysis software and further edited in GIMP 2.8.14 (GNU Image Manipulation Program).

## TAXONOMY

### Drosophilidae Rondani, 1856

### *Drosophila* (*Drosophila*) *montevidensis* **sp. nov.**

Figs. 1-8, 17-49, 54-55, 58-63

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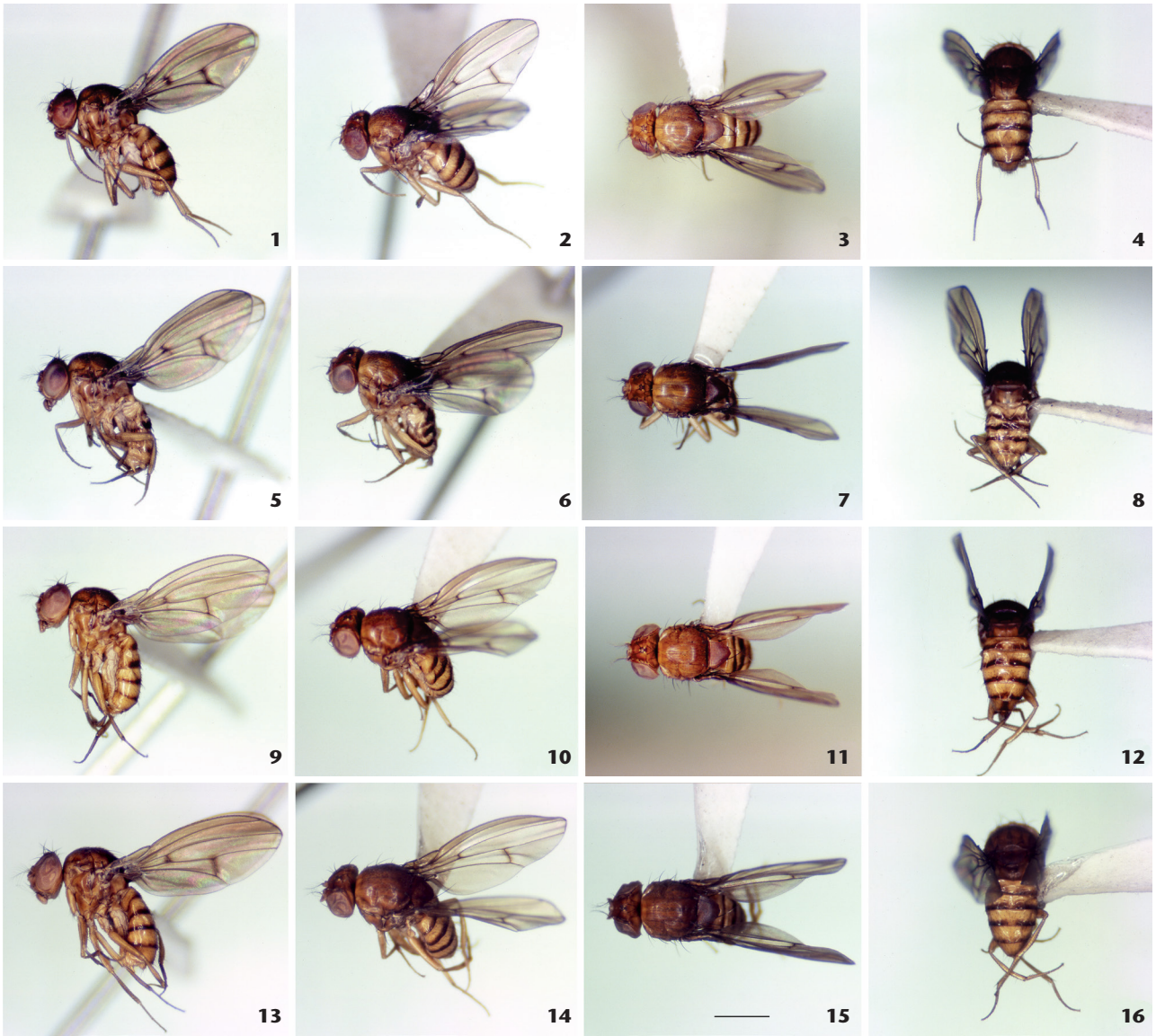
*D.* gr. *tripunctata* (subgroup I) Goñi et al., 1997: 90 (table 1, collected in banana-baited traps).

Unidentified species of the *tripunctata* group of *Drosophila* Goñi et al., 1998: 134 (table 2, geographic distribution), 137 (table




Figures 1-16. Male and female adults of two sibling species of the *Drosophila tripunctata* group: (1, 5, 9, 13) left lateral view; (2, 6, 10, 14) laterodorsal view; (3-4, 7-8, 11-12, 15-16) dorsal (thorax and abdomen) views. (1-8) *Drosophila montevidensis* **sp. nov.**: (1-4) male (isofemale line Q37F55, Montevideo, Uruguay); (5-8) female (isofemale line Q37F51, idem). (9-16) *Drosophila nappae* (isofemale line I73F254, São Paulo, Brazil): (9-12) male; (13-16) female. Scale bar: 1 mm.

3, breeding site), 139 [affiliation = not *D. angustibucca* Duda sensu Frota-Pessoa (1954)].

*Drosophila* aff. *nappae* Goñi et al., 2012: 308 (abstract), 312 (table 2, feeding site), 313 (distribution, level of association), 314 (abundance), 316 (abundance and richness).

Types. Holotype male, labeled "Uruguay – Montevideo, Montevideo city, Facultad de Agronomía, (34°50'69"S, 56°13'44"W), Beatriz Goñi *coll.*/net swept over fallen fleshy seeds of *Ginkgo biloba* 17.IV.2005/from isofemale line F6/*Drosophila montevidensis* ♂ Goñi and Vilela/HOLOTIPO [red label]" (MZSP). Paratypes: five males and one female same data as holotype, except isofemale line label (F1-F5), plus two males collected on the same place (MZSP). The latter two specimens were collected as follows: one male net swept over fallen, decaying fruits of *Syagrus romanzoffiana* (Cham.) Glassman (Arecaceae), and the other male over fallen, decaying fruits of *Psidium cattleianum* Afzel. ex. Sabine (Myrtaceae) but on 01.IV.2005.

Diagnosis. Scutum subshining tan, darkening gradually from anterior to posterior region, anterior half with two narrow, diffuse and slightly darker stripes between and just adjacent to the dorsocentral rows; scutellum darker, dull; facial carina large and broad, not sulcate; wing brownish, crossveins strongly clouded, C index = 3.6-4.2; three strong black setae in a line at base of metatarsomere I; abdomen shining yellow, tergites 2-6 with posterior dark brown bands medially slightly interrupted, not reaching lateral margins, and a variable (diffuse to well delimited) median, light brownish to dark brown longitudinal stripe; epandrium devoid of upper and lower setae (3-6 upper setae present in *Drosophila nappae*), gonopod subdistally microtrichose (without macrotrichia in *D. nappae*), aedeagus anterodorsally bearing a conspicuous pair of slightly membranous, dorsally somewhat sclerotized, finger-shaped processes, 2/3 the length of aedeagus (1/3 the length of aedeagus in *D. nappae*), backwards directed and covered with tiny spines, aedeagus distal end medially bearing a V-shaped (U-shaped in *D. nappae*) membranous area in dorsal view, ventral rod as long as aedeagus (shorter than aedeagus in *D. nappae*), ventral margin of aedeagus and posterior margin of ventral rod abruptly converging, as seen in lateral view (mildly converging in *D. nappae*); spermathecal capsule spherical (larger and somewhat elliptical in *D. nappae*), devoid of basal furrows (present in *D. nappae*).

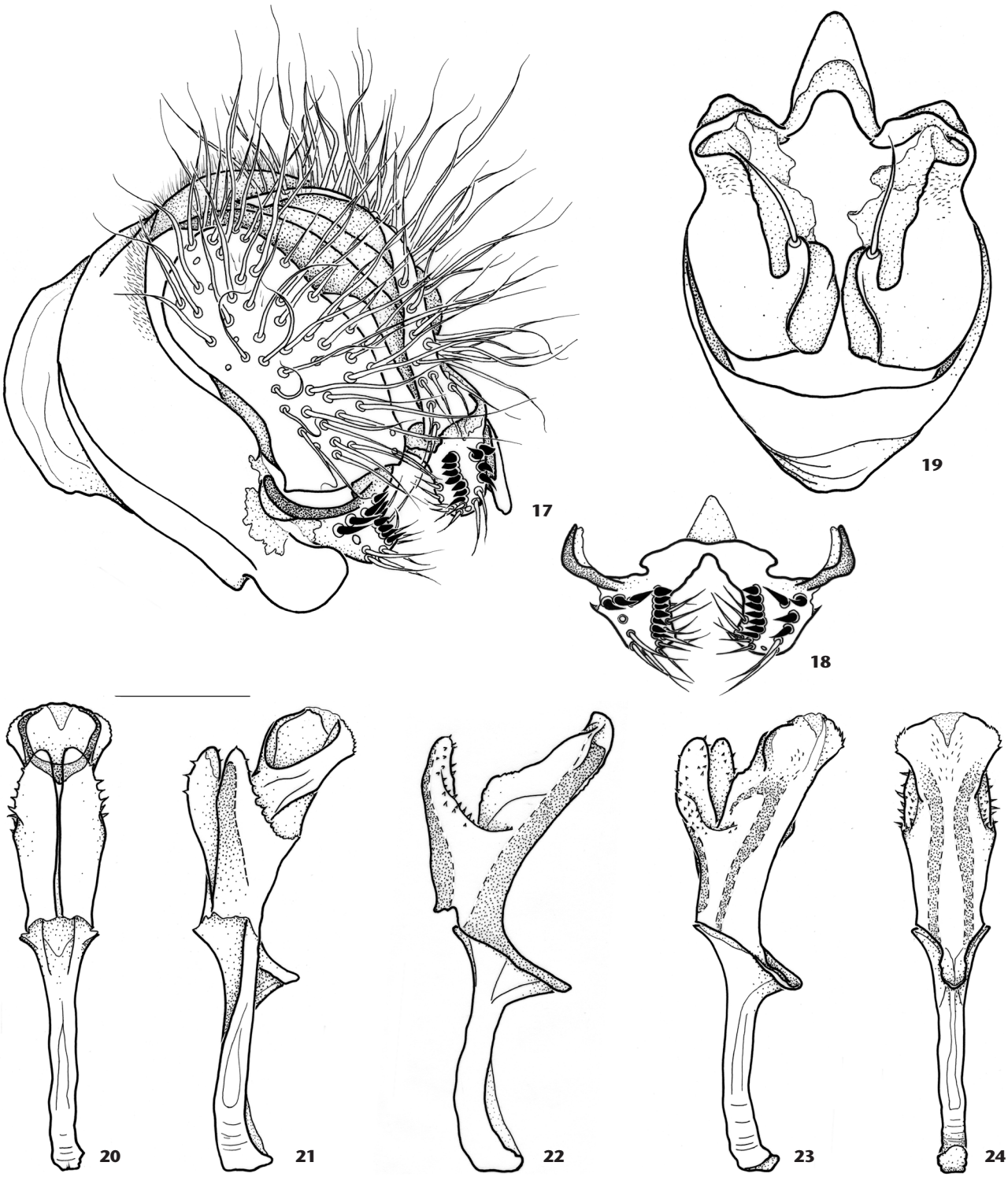
Description. Male (n = 8). Head. Frons mostly yellowish-brown, dull; frontal length 0.32 (0.29-0.37) mm, frontal index = 0.78 (0.71-0.86), top to bottom width ratio = 1.70 (1.56-1.93). Frontal triangle light brown, not well-defined, about 67-86% of frontal length; ocellar triangle dark brown, about 33-42% of frontal length, ocelli surrounded by conspicuous black crescents along inward-directed margins. Orbital plates light brown, subshining, about 80-108% of frontal length. Orbital setae black, or2 just outside of or1, shorter and about one-half diameter of larger setae of pedicel, distance of or3 to or1 = 50-80% of or3 to vtm, or1/or3 ratio = 0.73 (0.67-0.82), or 2/or 1 ratio = 0.40 (0.33-0.50), postocellar setae 64-83%, ocellar setae 86-108% of frontal length, vt index 1.17. Postocellar setae cruciate at tip. Face light brown, dull; facial carina slightly darker, broad, divergent downwards, not sulcate; vibrissal index = 0.45 (0.30-0.63). Cheek index = 8.10 (5.20-11.0). Eye red, dorsally remarkable darker. Eye index = 1.28 (1.19-1.39). Antenna brown to light brown; pedicel, dorsally darker, with two larger setae of about same size. First flagellomere short-haired; length to width ratio = 1.69 (1.50-2.00). Arista with 6 upper and 3-4 lower branches, plus terminal fork; 7-10 inner branches. Proboscis brown, palpus light brown with a row of about 5 long setae, decreasing in length from tip to middle area, plus several fine setulae.

Thorax. Length = 1.21 (1.15-1.32) mm. Scutum tan, posteriorly darker, subshining, 5-7 irregular rows of acrostichals. h index = 0.82 (0.67-0.91). Transverse distance of dorsocentral setae 180-243% of longitudinal distance; dc index = 0.82 (0.79-0.85). Prescutellar setae absent. Scutellum dark brown, dull, distance between apical scutellar setae about 73-90% of that between apical and basal one, basal setae divergent, apical setae cruciate at median region; scut index = 1.05 (1.00-1.10). Pleura light brown at anterior lower half, brownish dorsally and posteriorly, shining, sterno index = 0.52 (0.50-0.57); median katepisternal seta 67-100% of anterior one and noticeably thinner than other two, posterior one thicker. Proepisternal seta absent. Halter stalk pale yellow, halter knob proximally brown, yellowish at distal region. Legs uniformly light brown. Three strong black setae in line at base of inner surface of metatarsomere I, which is slightly wider than metatarsomere II, but not twice as wide, as it conspicuously occurs in *Drosophila platitarsus* Frota-Pessoa, 1954. One small thick black seta at base of inner surface of mesotarsomere I. Apical setae on protibia and mesotibia, the latter spur-shaped; preapicals on all three.

Wing. Brownish, slightly pointed at tip of $R_{4+5}$, crossveins clouded, tips of longitudinal veins slightly darkened; length 2.74 (2.46-2.93) mm, length to width ratio = 2.27 (2.20-2.35). Indices: C = 3.86 (3.63-4.16), ac = 1.74 (1.54-2.11), hb = 0.47 (0.45-0.52), 4C = 0.72 (0.66-0.76), 4v = 1.59 (1.52-1.75), 5x = 0.88 (0.79-1.00), M = 0.40 (0.38-0.43), prox. x = 0.76 (0.69-0.83).

Abdomen. Shining brownish-yellow, tergites 2-6 with a posterior, medially slightly interrupted dark brown band, not reaching lateral margins, and a variable (diffuse to well delimited) median, light brownish to dark brown longitudinal stripe, which may be completely absent in some specimens.

Terminalia (Figs. 17-24, 26-49). Epandrium almost bare, slightly microtrichose on posterior dorsal area; upper and lower setae absent; ventral lobe roundish, slightly covering surstylus. Cercus slightly microtrichose on dorsal area, linked to epandrium by membranous tissue. Surstylus not microtrichose, with about 7 cone-shaped prensisetae, about 4 long, strong outer setae and about 11 long, thin, mostly inner setae. Decasternum as in Fig. 18. Hypandrium (Fig. 19) as long as epandrium, anterior margin convex; posterior hypandrial process absent; dorsal arch present, strongly sclerotized; gonopod subdistally microtrichose, fused to paraphysis, bearing one long seta on median inner margin. Aedeagus (Figs. 20-24, 26-49) lateroventrally strongly sclerotized, anterodorsally bearing a distinctive pair of membranous, dorsally slightly sclerotized, finger-shaped, backwards directed processes, which are shorter than aedeagus (ca. 2/3 its length) and lateroventrally covered with tiny spines. Aedeagus in dorsal view (Fig. 20) bearing a small, slightly sclerotized, crescent-shaped plate at subdistal area which embraces the gonopore of endophallus; distal end medially bearing a V-shaped membranous area, distal margin rounded in dorsal as well as in ventral view (Figs. 31-35, 41-45, 48, 49) (remarkably angled in *Drosophila nappae*, Figs. 52-53). Aedeagal apodeme rod-shaped, laterally flattened, slightly shorter than aedeagus; anteriorly expanded dorsoventrally in aged males (Figs. 28, 38). Ventral rod completely fused to aedeagal apodeme, relatively long, remarkably right-angled in relation to ventral margin of the aedeagus as seen in lateral view (in *D. nappae* it is much shorter than aedeagus and obtuse-angled in relation to ventral margin of the aedeagus).




Figures 17-24. *Drosophila montevidensis* **sp. nov.** male holotype, terminalia: (17) epandrium, cerci, surstyli and decasternum, oblique posterior view; (18) surstyli and decasternum, posterior view; (19) hypandrium and gonopods+paraphyses [fused], posterior view; (20-24) aedeagus+aedeagal apodeme in several views from dorsal through ventral. Scale bar: 0.1 mm.

Female (n = 1). Main differences from male: usually larger; median anteroposterior stripe on tergite 6 seems to be thinner and paler than that of male.

Measurements. Frontal length 0.37 mm; frontal index = 0.79, top to bottom width ratio 1.58. Ocellar triangle 33% of frontal length. Orbital plates 93% of frontal length. Distance of or3 to orb1 = 67% of or3 to vtm, or1/or3 ratio not determined (or3 missing), or2/orb1 ratio = 0.33, postocellar setae = 60%, ocellar setae = 100% of frontal length, vt index = 1.25, vibrissal index = 0.36. Cheek index 7. Eye index 1.4. First flagellomere short-haired; length to width ratio 2.00. Arista with 7 upper and 3 lower branches, plus terminal fork; 8 inner branches. Thorax length 1.34 mm. h index = 0.75. Transverse distance of dorsocentral setae 250% of longitudinal distance; dc index not determined (bristles missing). Distance between apical scutellar setae about 82% of that between apical and basal one; scut index not determined (bristles missing), sterno index = 0.50, median katepisternal seta about 82% of anterior one. Wing length 2.98 mm, length to width ratio not determined (wings posteriorly broken). Indices: C = 3.96, ac = 1.69, hb = 0.41, 4C = 0.67, 4v = 1.52, 5x and M not determined (wings posteriorly broken), prox. x = 0.64.

Female terminalia (Figs. 25, 54, 55). Valves of oviscapt (Figs. 25, 54) pointed at tip, ventrally convex, dorsally rounded subdistally (angled in *D. nappae*, Fig. 56), with ca. 15 marginal and 5 discal peg-like ovisensilla; inner trichoid-like ovisensilla: 3 thin, distally positioned and 1 long, curved, subterminal. Spermathecal capsule (Fig. 55) spherical (larger and somewhat elliptical in *D. nappae*, Fig. 57), devoid of basal furrows (present in *D. nappae*); spermathecal duct distally dilated, becoming gradually wider apically, sclerotized.

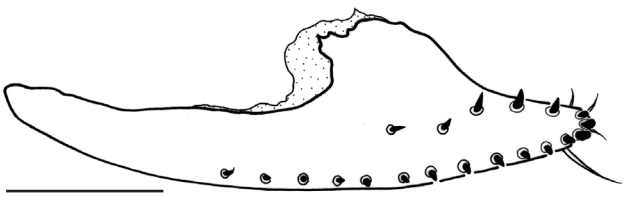


Figure 25. Left oviscapt valve of the female paratype of *Drosophila montevidensis* **sp. nov.**: outer lateral view. Scale bar: 0.1 mm.

Egg (n = 6). Length ca. 0.50 mm; four slender, divergent filaments; anterior pair slightly shorter than posterior pair.

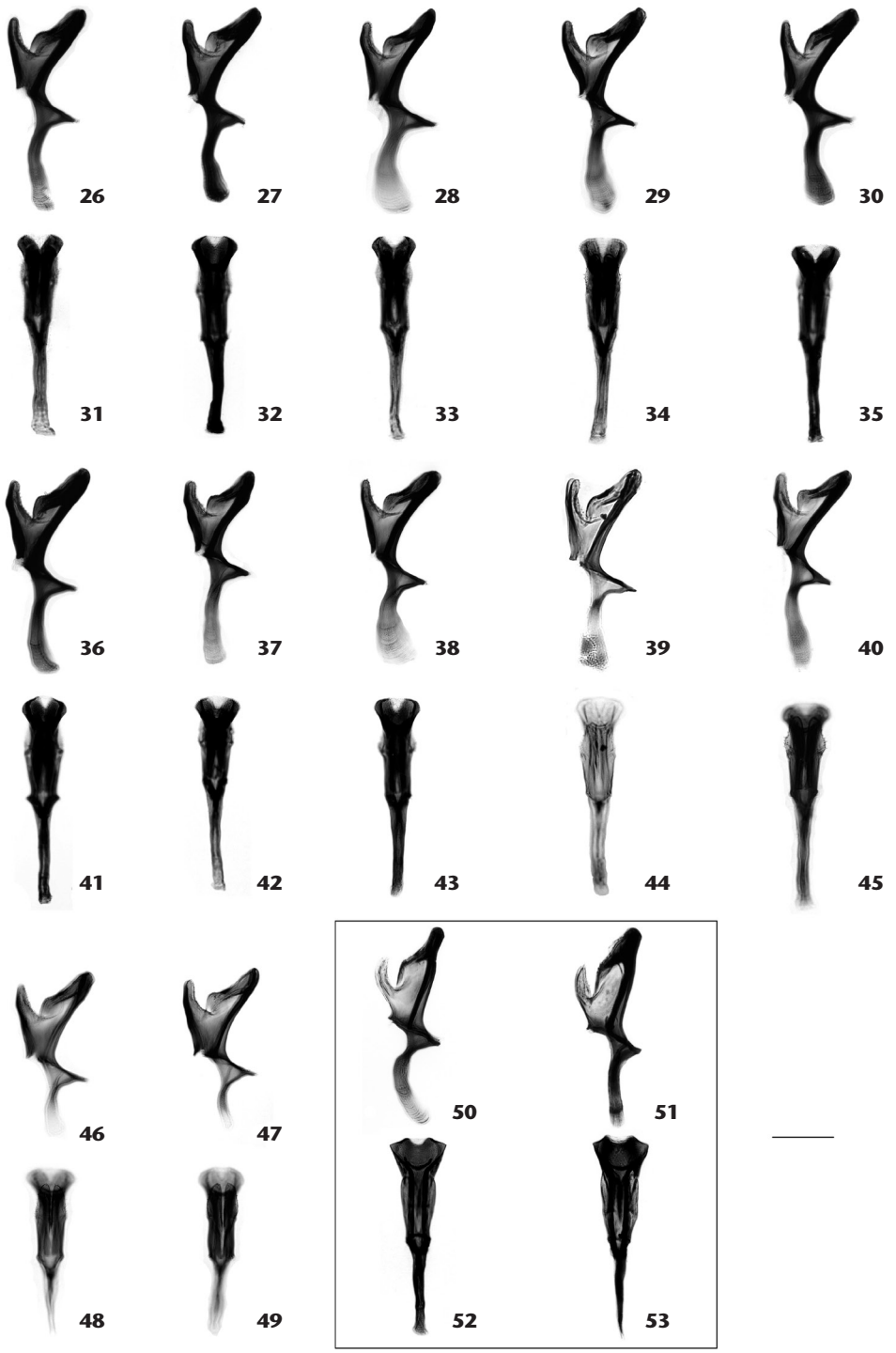
Puparium (n = 3). Reddish-brown; horn index ca. 3.9; each anterior spiracle with about 14 branches; anterior stalk as long as branches length; tip of stalk of anterior spiracle blackish brown; posterior spiracles relatively long, only slightly shorter than anterior spiracles stalks.

Chromosomes (Figs. 58-63). Basic diploid chromosome number of 2n = 12, XX in females and XY in males (Figs. 58-61), with the haploid karyotype formula: 5R, 1D. The 4 pairs of autosomes range from medium to small-sized acrocentrics but smaller than any of the sex chromosomes. In early C-banded prometaphase cells, the autosomes show a short heterochromatic arm (Fig. 59). The X chromosome, the biggest of the complement, has a large block of pericentromeric heterochromatin that covers almost half of its length and a tiny heterochromatic short arm, while the Y is heterochromatic and shorter than the X (Fig. 60, 61). Dot chromosomes are quite small. Prophase I cells of male meiosis show four bivalents representing the pairs 2, 3, 4, 5, the small dot chromosomes, and the heterologous XY association (Figs. 62, 63). The autosome bivalents pair along their length excepting the centric and paracentromeric regions. The sex chromosomes pair at a specific site, located at the distal heterochromatic region in the X and the proximal region in the Y chromosome (Figs. 62, 63).

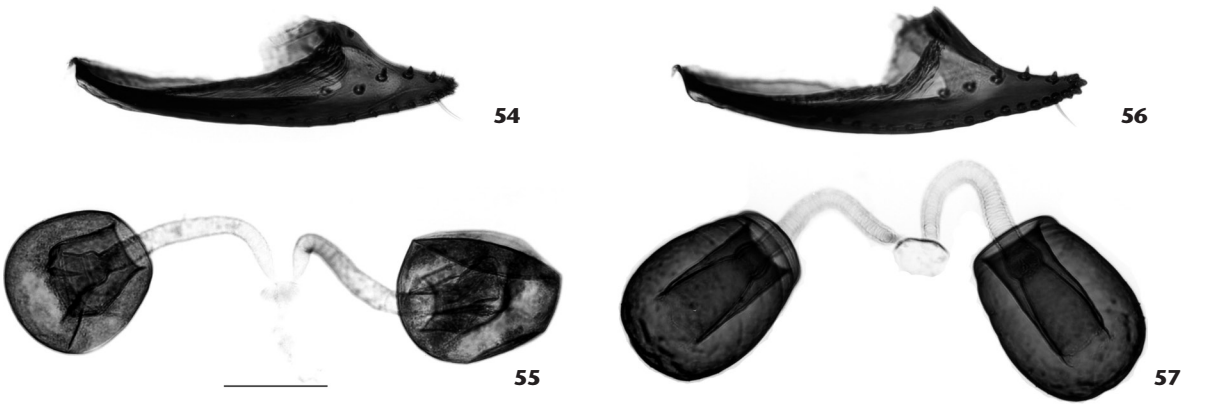
Distribution. Neotropical: Argentina (Buenos Aires) and Uruguay (Lavalleja, Montevideo, Rocha).

Remarks. This species belongs to the subgroup I (cf. Vilela 1992: 198) of the *Drosophila tripunctata* species group of the subgenus *Drosophila*. It shares with *D. angustibucca*, *D. mediocris*, *D. medioobscurata*, *D. nappae*, *D. neoguaramunu*, *D. platitarsus, D. rostrata*, and *D. setula*, the following remarkable features: aedeagus dorsally with a small, sclerotized, crescent-shaped plate at subdistal area, and anterodorsally bearing a pair of finger-shaped (sometimes diffuse) and backwards directed processes. The processes are small, diffuse and mostly membranous in all species except in *D. nappae*, where they are only slightly membranous and proportionally longer; and they are even longer in *D. montevidensis* **sp. nov.** Additionally, all of them but the latter two, have in common a sclerotized, inverted T-shaped area partially surrounded by the pair of processes in the anterodorsal, mostly membranous surface of aedeagus.

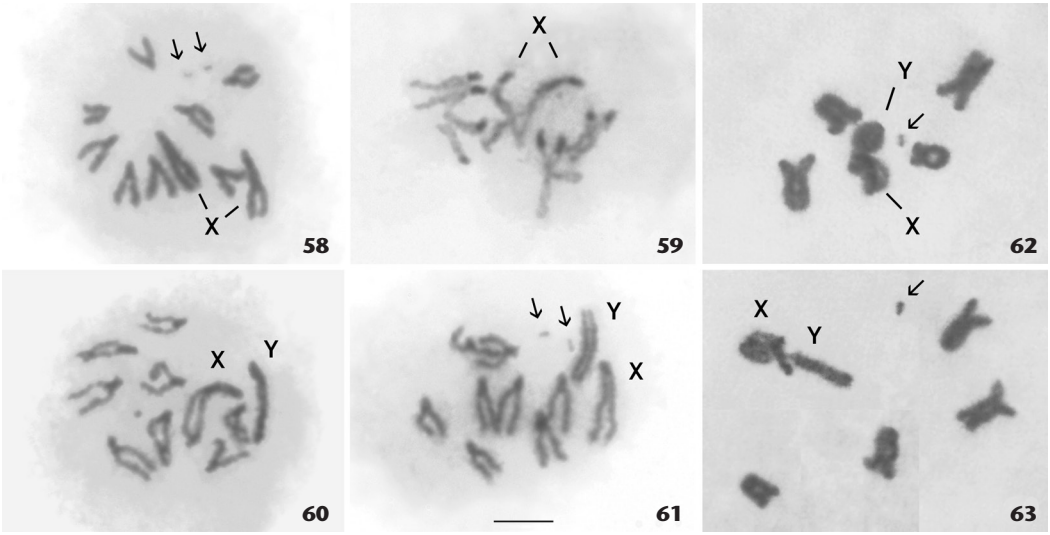
The karyotype of four out of the eight species included in the subgroup I of the *Drosophila tripunctata* group, namely *D. nappae* (originally referred to as *D. angustibucca*) (see Franck et al. 1984 and Pires 2000 [as *Drosophila* sp. U3]), *D. neoguaramunu* (see Frydenberg 1956), *D. platitarsus* (see Pires 2000) and *D. setula* (see Clayton & Wasserman 1957), were reported. Apparently, the observed haploid karyotype of *D. montevidensis* **sp. nov.** (n = 6) is indistinguishable from *D. nappae*, with 5R, 1D (Y chromosome is a rod shorter than X); however, it differs remarkably from the haploid karyotype formula of *D. neoguaramunu* (n = 3), with 3V (X chromosome considerably shorter than rod-shaped Y chromosome), in samples collected from Peru (Frydenberg 1956). The karyotype of these species differ from that of *D. platitarsus* (n = 6), being 4R, 1V, 1D (V-shaped X and J-shaped Y), with heterochromatic pericentromeric regions in the rod-shaped pairs, the dots, but differ in the shape of the Y, and the location of the heterochromatin in the X chromosome (interstitially located in one arm, and proximally, at the pericentromeric region, in the other arm), in samples of an isofemale line derived from an individual collected at the Forest Reserve of the IB-USP, located in the Cidade Universitária "Armando de Salles




Figures 26-53. Aedeagi + aedeagal apodeme of two sibling species of the *Drosophila tripunctata* group: (26-30, 36-40, 46-47, 50-51), left lateral view; (31-35, 41-45, 48, 49, 52, 53), dorsal view. (26-49) *Drosophila montevidensis* **sp. nov.**: (36, 41) holotype; (26-35, 37, 38, 42, 43) paratypes; (39, 44) Montevideo (Cerro Montevideo, Parque Vaz-Ferreira); (40, 45, 46-49) Rocha (Laguna Negra, Don Bosco camping), specimen E; (46, 48) idem, specimen U; (47, 49) idem, specimen W; (50-53) *Drosophila nappae*: (50, 52) isofemale line I42F56, São Paulo (Forest Reserve of IB-USP); (51, 53) wild-caught, Porto Alegre (RS). Scale bar: 0.1 mm.




Figures 54-57. Left oviscapt valve and pair of inner spermathecal capsules of two sibling species of the *Drosophila tripunctata* group, outer lateral and lateral views respectively: (54, 55) *Drosophila montevidensis* **sp. nov.**, female paratype; (56, 57) *Drosophila nappae*, isofemale line I42F56, São Paulo (Forest Reserve of IB-USP). Scale bar: 0.1 mm.




Figures 58-63. Mitotic and meiotic chromosomes of *Drosophila montevidensis* **sp. nov.** (58-59) female and (60-61) male metaphase plates from larval neuroblasts; (59) female prometaphase cell showing C-banded proximal heterochromatin in all chromosomes; (62-63) male meiotic prometaphase I chromosomes showing four bivalents representing the autosomes 2, 3, 4, 5 and the small dot chromosome, and the heterologous XY association. Sex chromosomes are indicated in all cells, and arrows indicate the dot chromosomes. Scale bar: 10 µm.

Oliveira", São Paulo city, state of São Paulo, Brazil (Pires 2000). They also differ from that of *D. setula* (n = 6) with 4R, 1V, 1D in a strain from Santa Martha, Colombia, and (n = 5[?]) with 3R, 1V, 1D (?) in a strain from Barro Colorado Is., Canal Zone, Panama (Clayton & Wasserman 1957). There is no description of the sex chromosomes for *D. setula* in the latter reference. These data reveal that, excepting for *D. montevidensis* **sp. nov.** and *D. nappae,* a high interspecific karyotype variation is found among three species of the subgroup I of *D. tripunctata* group. The polytene chromosomes map of *D. nappae* (misidentified as *D. angustibucca*) described by Franck et al. (1984) allows the opportunity to investigate the genetic divergence between this pair of sibling species by using polytene banding pattern as primary chromosomes markers. The feasibility to maintain laboratory strains of both sibling species let to investigate other biological aspects, such as life cycle, the existence or not of reproductive isolation mechanisms. So far, *D. montevidensis* **sp. nov.** has been collected in natural areas of southern Uruguay as well as in urban areas along both margins of Rio de la Plata (Buenos Aires and Montevideo cities), as well as other localities of the province of Buenos Aires and at southern and southeastern Departments of Uruguay (as detailed in material examined). Up to date, it has been absent in drosophilid samples emerged from decaying fruits collected in northern Uruguay, Department of Salto (B.

Goñi, unpublished data). However, the apparently allopatric distribution of *D. montevidensis* **sp. nov.** and its sibling species, *D. nappae*, remains to be confirmed.

Laboratory Cultures. It is cultivated at 18 °C with a modified banana-agar culture medium (recipe above).

Etymology. The specific name is an adjective in allusion to the type locality (Montevideo city).

Material examined. Type series (8 males, 1 female, as detailed above) plus 318 non-type specimens (142 males, 103 females, and 73 adults not sexed) which were analyzed for distributional and ecological purposes only, as detailed below. Argentina. *Buenos Aires*: Azul city (36°46'39"S, 59°51'48"W), 1 female, net swept over fallen, decaying infructescence of *Ficus cairica* L. (Moraceae), 06.IV.2006, B. Goñi leg. (MZSP); Buenos Aires city, Universidad de Buenos Aires, Facultad de Agronomía, Jardín Botánico "Lucien Hauman (34°35'36"S, 58°29'03"W), 2 males (MZSP) and 5 females (FCE-D), net swept over fallen, decaying fruits of *Butia capitata* (Mart.) Becc. (Arecaceae), 2 males, 3 females (MZSP), plus 10 males, 2 females (offspring of isofemale line Q23F2, MZSP), net swept over fallen, decaying fruits of *Ocotea acutifolia*, *Crataegus* sp. and *Butia yatay* (Mart.) Becc. 1916 (Arecaceae) (locally known as butiá), 11, 18, 27.IV.2006, B. Goñi leg. Uruguay. *Lavalleja:* Sierra de Minas (woodland sierra, riparian forest and pine plantation habitats, between 34°30'59"S, 55°20'07"W and 34°30'54"S, 55°19'53"W), 10 males, 4 females (dung traps), 4 males, 3 females (carrion traps), V.2002-IV.2003, P. González-Vainer leg. (FCE-D) (Goñi et al. 2012). *Montevideo*: Montevideo city, Cerro Montevideo, Parque Vaz Ferreira (near waterpond, 34°53'49"S, 56°15'41"W), 3 males, 1 female in banana-baited traps, I, VI.1994, B. Goñi & M.E. Martinez leg. (FCE-D) (Goñi et al. 1997); Universidad de la República, Facultad de Agronomía (backyard garden, 34°50'69"S, 56°13'44"W) as follows: 1 female, emerged from fallen, decaying fruit of *Butia yatay* (Mart.) Becc. 1916 (Arecaceae) (locally known as yatay), 1 female in banana-baited trap, IV, V, XII.2000, B. Goñi, P. Fresia, M. Calviño & M.J. Ferreiro leg. (FCE-D); 5 males, 2 females, emerged from fallen, decaying fleshy seeds of *Ginkgo biloba* (locally known as ginko), V.2005, B. Goñi & M.E. Martinez leg. (FCE-D); 10 males (MZSP), plus 10 males, 3 females (isofemale line Q37F51), 10 males, 5 females (Q37F53), 11 males, 3 females (Q37F54), 9 males, 5 females (Q37F55), 7 males, 2 females (Q37F56), 5 males, 2 females (Q37F57) and 4 males (Q37F58), net swept over fallen, decaying fleshy seeds of *Ginkgo biloba*, 6, 10, 16.V.2006, Goñi & M.E. Martinez leg. (MZSP); the following 127 specimens were net swept over fallen, decaying fleshy seeds of *Ginkgo biloba*, detailed as follows: 6 males, 5 females, III-V.2005, B. Goñi & M.E. Martinez leg. (FCE-D); 73 adults not sexed, 6, 10, 16.V.2006, idem leg. (FCE-D), and 14 males and 29 females offspring from eight isofemales (Q49F1 to F3, and Q49F5 to F9), 19.IV-15.V.2007, B. Goñi leg. (FCE-D). *Rocha*: Boca del Sarandí, on the western shore of the Laguna Negra (34°00'36"S, 53°45'26"W), 1 female, emerged from fallen, decaying cladode of *Opuntia arechavaletai* Speg. 1905 (Cactaceae) (locally known as opuntia), 4.VII.1995, M.E. Martinez leg. (FCE-D) (Goñi et al. 1998); Laguna Negra, Don Bosco camp gallery forest, (53°45'18"W; 34°05'24"S), 20 males, 25 females, net swept over fallen, decaying fruits of *Schinus longifolius* (Lindl.) Speg. (Anacardiaceae) (locally known as molle), 17-25.V.2003, B. Goñi, M.E. Martinez, I. Machado, M. Gandelman, I. Corvo & M.J. Cabrera leg. (FCE-D).

## *Scaptomyza* (*Mesoscaptomyza*) *pipinna* **sp. nov.**

Figs. 64-78

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Types. Holotype male (dissected), labelled: Uruguay – Departament of Rocha, Sarandí del Consejo [creek, near north shore of Laguna (lagoon) de Castillos], 34°16'86"S, 53°59'08"W, M.E. Martinez *coll.*/segada [net swept over grass], 15.X.1994/pradera [prairie]/*Scaptomyza pipinna* ♂ Goñi & Vilela/HOLOTIPO [red label]" (MZSP).

Diagnosis. Frons yellowish-brown, dull, lacking defined stripe (present in *Scaptomyza striaticeps*), orbits and anterior region lighter, ocellar triangle dark brown, antennae brown, medial vertical convergent and conspicuously long (longer than frontal length), vt index 1.63; scutum light brown, with three prominent brown longitudinal stripes, the central one extending to the end of scutellum; one pair of small presutural dorsocentrals; a single dorsal pleural stripe extending to postscutellum; wing clear; epandrium devoid of upper and lower setae (lower setae present in *S. striaticeps*), cercus slightly fused to epandrium on anteroventral corner (not fused in *S. striaticeps*), aedeagus straight (bent upwards in *S. striaticeps*) in lateral view.

Description. Male (n = 1). Head. Frons mostly yellowish brown, dull, anterior 1/3 light yellow and medially brownish, devoid of a broad blackish stripe from ocelli to anterior margin; frontal length 0.24 mm, frontal index = 0.83, top to bottom width ratio = 1.42. Frontal triangle indistinct; ocellar triangle prominent dark brown, about 40% of frontal length. Orbital plates light brown, subshining, apically divergent from eye margin, about 80% of frontal length. Orbital setae black, or2 just outside of or1, shorter and about one-half diameter of proclinate setae of pedicel, distance of or3 to or1 = 40% of or3 to vtm, or1/or3 ratio = 0.86, or2/or1 ratio = 0.50, postocellar setae 80%, ocellar setae 80% of frontal length. Medial vertical convergent and remarkably long (longer than frontal length) (Fig. 64), vt index 1.62. Postocellar setae cruciate at tip. Face yellowish, dull; facial carina rudimentary, not sulcate; vibrissal index = 0.57. Cheek index = 7.50. Eye index = 1.25. Antenna brown, globose, pedicel with two larger setae, anterior ones proclinate and larger, reaching tip of flagellomere I, posterior ones directed outwards. First flagellomere with median-sized hairs; length to width ratio = 1.00. Arista with 3 upper and 2 lower branches, plus one long terminal fork; 6 inner branches. Proboscis light brown, elongated, palpus dark brown with 1 terminal seta as long as vibrissa, but thinner, 1 smaller subterminal seta half the length of terminal, plus several fine setulae.


Figures 64-66. *Scaptomyza pipinna* **sp. nov.** male holotype, adult: (64) left lateral view; (65) laterodorsal view, (66) dorsal view. Scale bar: 1 mm.

Thorax. Length = 0.78 mm. Scutum light brown, subshining, bearing three conspicuous, brown, longitudinal stripes, the central one extending to the tip of scutellum, the two lateral ones lying outside the dorsocentrals, extending onto the sides of scutellum (Fig. 66); one dorsal, brown, conspicuous, pleural stripe, narrow at proepisternum, widening at katepisternum, extending to postscutellum and including meso and metathoracic spiracles. Apparently 2 irregular rows of acrostichals (most of them are broken off) at presutural area. Apparently only one postpronotal. Transverse distance of dorsocentral setae 143% of longitudinal distance; dc index undetermined. A pair of additional small dorsocentrals, twice as long as adjacent acrostichal setulae, just anterior to transverse suture. Prescutellar setae absent. Scutellum with a large, diffuse, brown stripe at center, light brown laterally, subshining; distance between apical scutellar setae about 67% of that between apical and basal one, basal setae parallel, apical setae cruciate at median region; scut index undetermined. Pleura yellow at lower half, with a brownish stripe at upper half, subshining, sterno index undetermined; median katepisternal seta 50% of anterior one and noticeably thinner. Proepisternal seta absent. Halter long, pale yellow, contrasting with brownish background of pleural longitudinal stripe. Legs uniformly yellow, except metatarsomere V, brownish. One black seta at base of inner surface of mesotarsomere I, apical setae on protibia and mesotibia, the latter spur-shaped; preapicals on all three.

Wing. Hyaline, length 2.00 mm, length to width ratio = 2.42. Indices: C = 3.31, ac = 2.00, hb = 0.35, 4C = 0.67, 4v = 1.46, 5x = 1.57, M = 0.46, prox. x = 0.42.

Abdomen shining dark brown with a dorsal pattern of pale yellow areas except on the last tergite.

Terminalia (Figs. 67-78). Epandrium microtrichose on posterior area; upper and lower setae absent; ventral lobe pointed at tip, bearing 1 robust terminal seta and 2 thin, subterminal setae (Fig. 67) arranged in tandem, not covering surstylus. Cercus mostly microtrichose on anterior area, slightly fused to epandrium on anteroventral corner; ventral surface without any sclerotized spine, but medially bearing four setae emerging from an irregular, sclerotized spot, preceded by a membranous, turned frontwards, rectangular area; ventral cercal lobe absent. Surstylus not microtrichose extensively fused to epandrium, with about 4 long, marginal setae, and three smaller, thinner setae on outer surface (Fig. 68). Decasternum with straight anterior and posterior margins, the former slightly incised at middle (not shown in Fig. 67 because anterior margin is curved frontwards), the latter medially protruding sharply backwards, as in Fig. 67. Hypandrium short, about half the length of epandrium, anteriorly narrow, anterior margin convex; posterior hypandrial process and dorsal arch absent (Fig. 69); gonopod posteriorly more sclerotized, laterally double-walled, linked to paraphysis by membranous tissue, bearing one tiny setula on middle inner margin (Figs. 70, 71). Aedeagus tiny, straight in lateral view, tube-shaped; distal tip membranous (Figs. 70-76). Paraphysis triangle-shaped (Fig. 74), ca. 2/3 aedeagus length, double-walled (Fig. 76), blunt at tip, bearing two tiny terminal setulae (Figs. 73, 74). Aedeagal apodeme rod-shaped, longer than aedeagus, posteriorly fused to it (Figs. 75, 76). Ventral rod absent.

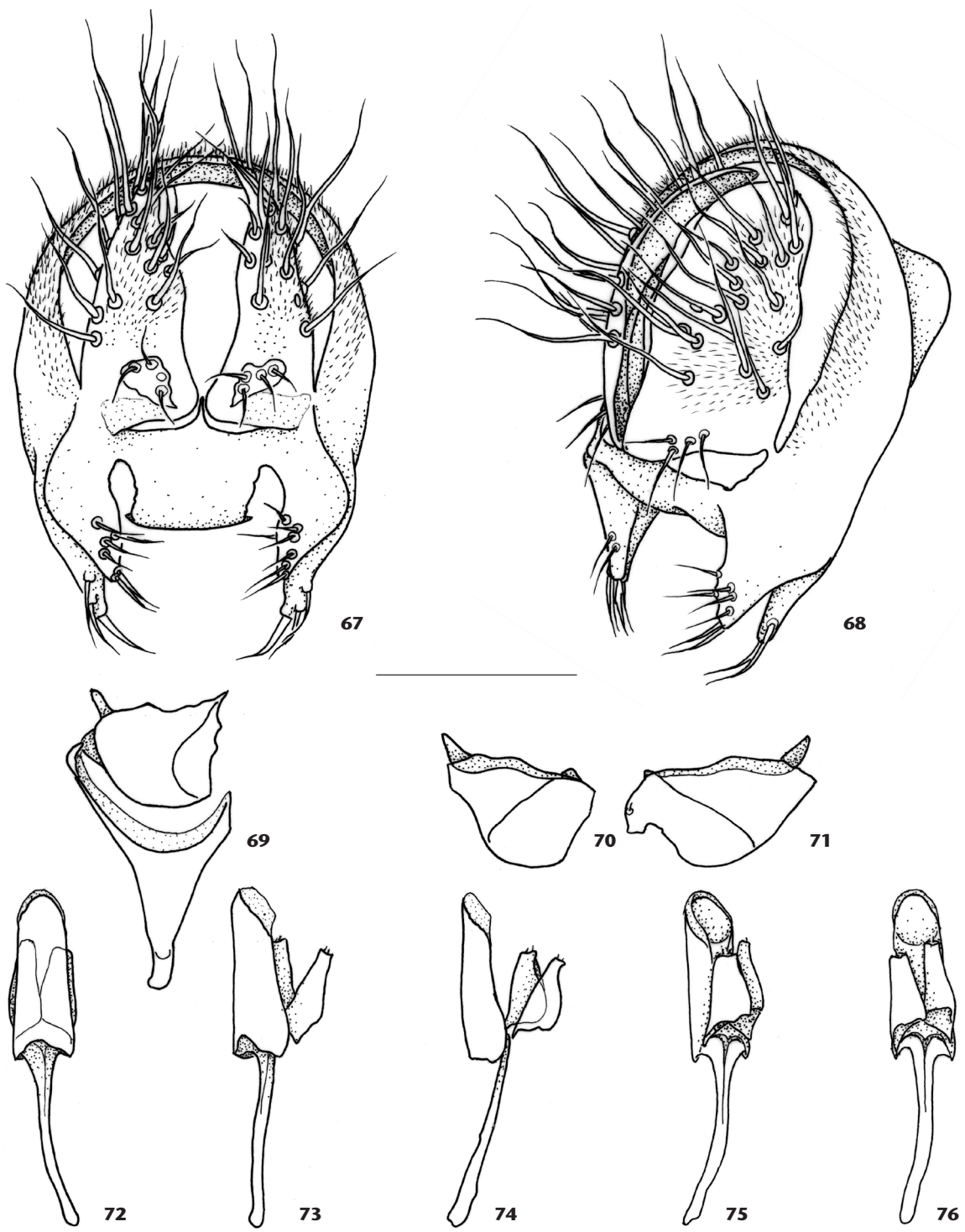
Female. Unknown.

Distribution. So far only known from its type locality.

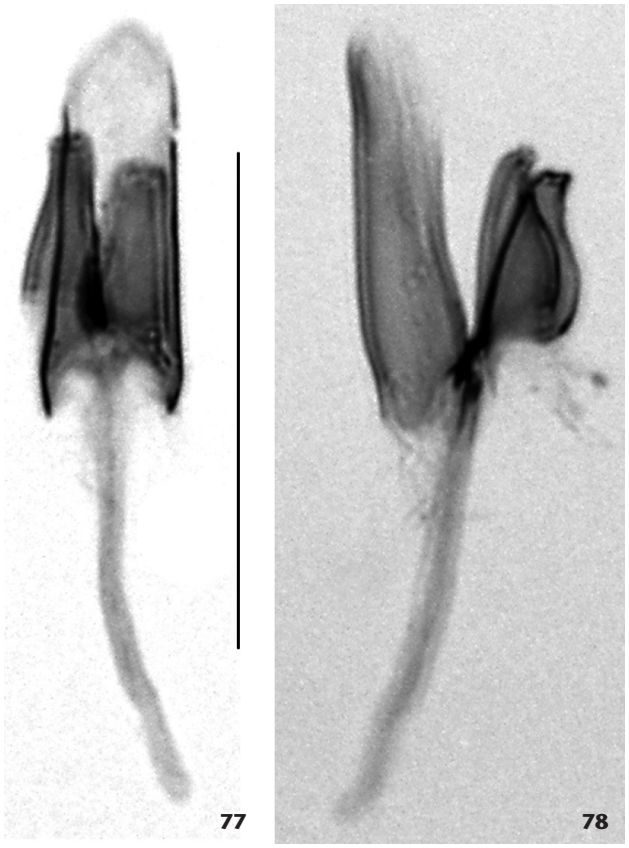
Remarks. *Scaptomyza pipinna* **sp. nov.** belongs to the subgenus *Mesoscaptomyza*. The male terminalia shows similarities with those of two species depicted by Hackman (1959) and Wheeler & Takada (1966: figs. 15.10 and 18.10).The straight aedeagus, although cylinder-shaped, reminds to those of *S. paravittata* Wheeler, 1952, from California, and *S. setosa* Wheeler & Takada, 1966, from Ecuador, which are somewhat cone-shaped; its decasternum and epandrium are similar to those of the Colombian *S. striaticeps*, from which it differs mainly by the absence of the paralobe sensu Hackman (1959).

Etymology. The specific name *pipinna* is a noun in apposition, in allusion to the tiny size (~ 81 µm long) of the aedeagus.

Note. While transferring the terminalia sclerites from the microscope slides to the glass microvial, the epandrium and hypandrium have been accidentally lost and only the aedeagus+aedeagal apodeme and paraphyses, together with the remains of abdominal tergites and sternites, are preserved in the microvial attached to the double-mounted holotype.




Figures 67-76. *Scaptomyza pipinna* **sp. nov.** male holotype, terminalia: (67) epandrium, cerci, surstyli and decasternum, posterior view; (68) idem, oblique posterior view; (69) left side of hypandrium and left gonopod (right side of hypandrium accidentally broken and right gonopod accidentally detached), posterior view; (70) left gonopod, posterior view; (71) right gonopod, posterior view; (72-76) aedeagus+aedeagal apodeme, and paraphyses, several views from dorsal through ventral. Scale bar: 0.1 mm.




Figures 77-78. *Scaptomyza pipinna* **sp. nov.** male holotype, aedeagi+aedeagal apodeme and paraphyses: (77) dorsal view; (78) left lateral view. Scale bar: 0.1 mm.

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